PRESS RELEASE

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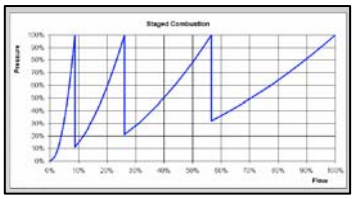
OPTIMISATION OF AN ELEVATED STAGED FLARE FOR A LARGE GAS PLANT

In recent years, gas plants have become increasingly larger in size (more than 3.5 MMkg/hr), with a consequent increase in their required flaring capacity. At the same time there is the requirement to have smokeless flaring, both at very low flow rates and at the total design flow rate capacity. This, in conjunction with increasingly more stringent pollution regulations, have presented new process and design problems that have been addressed and resolved by using an elevated staged flare system, developed by Hamworthy Combustion Group.

Hamworthy Combustion Group have a uniquely successful track record of supply of this new flare concept, developed in the last five years and now recognised as a product leader.

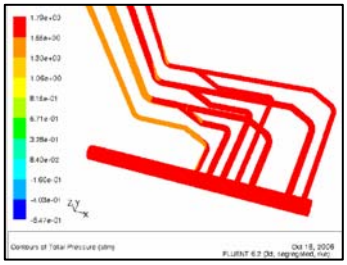
Staged flares are fed from a manifold that distributes the flow, by means of automatic on/off butterfly valves located at the base of the flare stacks, to individual flare stacks, each one equipped with a flare tip.



The first stage is open directly to atmosphere and is fitted with a dynamic dedicated “Gaseel” type seal, ensuring a smokeless flame for the maximum continuous operational flaring rate.

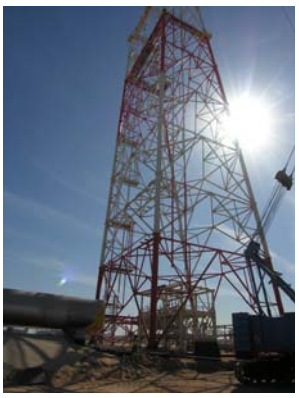
The other stages are fitted with staging valves and dedicated safety emergency devices (rupture disc-pins), and consist of multi-branch sonic type flare tips.

- The number of flares in operation is proportional to the relief gas flow.
- The total stream is segregated into different flares, with a reduction in the diameter of each flare tip.
- The first stage flare tip is fitted with steam facilities to ensure smokeless flame.
- Steam flow control is performed using the Hamworthy Combustion “Flarscan” system.
- For safety and modularisation reasons, each stage, and relevant flare tip has been designed to address the additional flaring rate in the event of a staging valve failure.



- The size of the tip on the first stage has been designed to limit the gas exit velocity to 0.2 Mach at smokeless flow rate, and to 0.5 Mach at maximum flow in order to avoid vibrations.
- Average low flame emissivity.
- Lower heat radiation at grade.
- Reduced gas dispersion at grade.
- Reduced header, sub-headers, risers and valves size, and hence lower cost.
- The main flare sub-headers and flare risers have been sized for a maximum velocity of 0.5 Mach to limit the pressure drop across the valves and to attenuate the noise of the whole system.

Derrick Construction at site



Analysis to identify the best configuration for a flare capable of managing very large flaring rates from a single header confirms that the solution of an elevated staged flare has the advantages of a) limiting size of the flare tips without introducing flame stability issues; b) distribution of the steam to the first stage, which will address other emergency scenarios characterised by lower flow rate; c) guaranteeing a longer life cycle for the flare tips which would normally be closed and require continuous purging.

These factors, in conjunction with the fact that the design flaring rates are related to emergency scenarios that are very unlikely to occur have allowed the designers to set the height of the flares at 130m allowing for a reasonable, reliable, and cost effective solution.

For more information about our products and services visit www.hamworthy-combustion.com
Hamworthy Combustion Engineering Srl, Via A. Gramsci, 11 – 20035 Lissone (MI) Italy
Tel: +39 039 2434 010 Fax: +39 039 2143 290 Email: info@hamworthy-combustion.it

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